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Commissioner of Japan Patent Office:
1. Title of the Invention: Patent Application
2. Inventor: February 6, 1975
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3. Applicant: Air sterilization and purification apparatus
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 (1) Specification 1 set
 (2) Drawings 1 set
 (3) Duplicate Copy of Application 1 set
 (4) Power of Attorney 1 set Method Examination
 (5) Request for Examination 1 set

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Specification

1. Name of the Invention: Air Sterilization and Purification Apparatus

2. Scope of Patent Claims

In an air purification apparatus that passes positively charged airborne dust between opposing electrodes, an air sterilization and purification apparatus wherein air is caused to pass through while inducing a separation phenomenon by switching the direction of flow of air that passes through the aforementioned opposing electrodes and modifying a cross section of the passage.

3. Detailed Description of the Invention

The invention of the present application is one that relates to an air sterilization and purification apparatus, and in a purification device that causes airborne dust particles to be absorbed by static electricity, relates to a device capable of raising dust removal effectiveness, and is intended to achieve an air sterilization and purification apparatus that, in particular, is made up of a combination of novel and ever simpler elements, is manufactured by a simple process with lower costs of production, and that, with excellent safety, is capable of achieving even better results in use.

Along with the development of heavy industry, air pollution from sources at each stage of the production process, nitrous oxide and sulfur dioxide emitted from transportation sources, and heavy metal particulates, have steadily increased. The widespread expansion of pollution has become an issue of serious concern to society, and various regulations have been proposed to prevent pollution, including preventing the generation of toxic materials as well as the strengthening of emissions standards. These approaches, however, cannot be considered adequate, and there are a growing number of people who suffer from lung cancer and other cancers as well as an increase in the number of people suffering from asthma. Air purifiers have become a common and indispensable part of life and are to be found installed in homes and sickrooms to prevent and/or treat these illnesses, and are used as prevention or treatment devices in the production stages of sanitary pharmaceuticals, foods, devices, and are also employed in the production of precision machinery.

A variety of devices have been suggested to cleanse the air by removing airborne toxic materials. Among those are air purifiers that use filter materials in air flow passageways to physically collect the dust, or electrical air purification devices such as dust removers that make use of static electricity or infrared rays to disinfect the air, or a combination of any of these approaches in order to remove toxic materials.

Among these, suggestions for conventional devices based on the aforementioned use of static electricity are known, including, for example, (a) an approach utilizing centrifugal force designed such that air, induced from an air inlet, passes through an ionization element while electrical voltage is applied to the inner and outer cylinders while the inner cylinder rotates, moving the air between the inner and outer cylinders, and (b) an approach where, in the above configuration, the outer circumference of an inner cylinder has inclined guide vanes provided in the axial direction along the outer circumference of the inner cylinder and rotational movement is applied to the air as it passes through between the inner and outer cylinders to make use of centrifugal force.

The above mentioned approaches have attempted combined dust collection by the use of electrostatic migration and centrifugal force, however, because high voltages with 11 KV in between the inner and outer cylinders, and as a result of rotating the induced air, a rectified electricity may be generated due to frictional resistance depending upon the air flow rate, and electric discharge sparks may occur between the dust particles that have collected onto the external cylinder, frequently causing risk of electrocution as well as the increased production of ozone and possible malfunction of the device.

In view of the above, research conducted by the inventors of the present application have overcome and eliminated the well known defects described above, and have perfected a device that is superior in terms of safety and that markedly increases the efficiency with which dust is adsorbed. The invention comprises a fan motor; an inner cylindrical electrode that has a

built-in high-voltage transformer, and that is connected to the positive side; a high voltage cap connected to the negative side; an external cylindrical electrode that is earthed; and a housing that has openings on both sides, and that is supported by a pedestal. On occasion that airborne dust that is guided into the unit through the upper inlet passes through an ionization section high-voltage cap that is connected on the negative side, a positive charge is applied to the dust, and it is guided into the electrostatic field between the grounded outer cylindrical electrode and the positive inner cylindrical electrode, and as a result of the electrostatic induction effect, airborne dust passing through is adsorbed onto the surface of the outer cylindrical electrode. Thus, the present invention is characterized by having opposing electrodes that have a plurality of parallel curved surfaces and a plurality of convex curved surfaces or recessed curved surfaces on the inner cylinder and an outer cylinder provided with a plurality of parallel curved surfaces and a plurality of convex curved surfaces or recessed surfaces, wherein the convex curved surfaces or recessed surfaces of the inner cylinder and the convex surfaces or recessed surfaces of the outer cylinder alternate with each other. By creating an electrostatic field between these opposing cylinders, the direction of the flow of air passing through them can be alternated, and the flow passageway cross section can be altered so that the flow rate fluctuates, thereby creating a flow separation phenomenon. This causes the generation of a stagnant flow, a reverse flow, or a turbulent flow of air that contains dust. The intention here is to extend the duration of the effect of the electrostatic adsorption on the outer cylindrical electrode surface and to increase in the efficiency of dust removal. The next object of this invention is to provide a device with superior safety. Additionally, an object of the invention is to provide a simple and compact mechanism that can be made available at low cost and that can be placed easily in a variety of locations, as well as to provide a device that allows simple, easy, and safe cleaning of the panel upon which the dust has been adsorbed. Other objects and characteristics of the present invention can be understood from the following explanation.

In Figs. 1 through 5, a housing acceptor cylinder (5) is supported on a stand (1) by means of a shaft (2) upon which a support board (4) consisting of insulating material and provided with exhaust windows (3); an external cylinder accepting cylinder (7) is mounted on the edge of the lower opening section of said housing; an exhaust windows (6') is arranged in the external cylinder barrel (7); and a fan motor (8) is internally installed in a motor cap (9). The fan motor (8) (for practical purposes, preferably with a maximum torque of $1040 \pm 10\%$) is connected to a power source, and the motor cap (9) has a built-in high-voltage transformer (11) that is connected to a power source. An inner tube electrode (14) made of metal and provided with stepwise alternating vertical curved surfaces (12) and convex curved surfaces (13) is installed onto the positive side of the high-voltage transformer, and a rounded-head inner cap (16) made of insulating material and continuing the multiple outer cylinder support [illegible] (15), (15) is mounted in the top opening of this inner cylindrical electrode (14). A metallic high voltage cap (18) that is provided with a limit switch (17) is installed in this cap (16) and connected to the negative side of the high-voltage transformer and a metallic outer cylindrical electrode (22) provided with stepwise alternating vertical curved surfaces (20) and recessed curved surfaces (21) on the upper opening edge step section (19) of the outer cylinder acceptor (7). The vertical arced surfaces (20) and the recessed arced surfaces (21) are positioned so as to face the swelling arced surfaces (12) on the inner cylindrical electrode (14) and the vertical arced surfaces (12) on the inner cylindrical electrode (14) with each other, respectively. The external cylindrical electrode (22) faces the inner cylindrical electrode (14). According to FIG. 1, an air inlet window (23) is arranged in the upper opening of the external cylindrical electrode (22), and a retainer plate (25) made of insulating material is provided on the bottom limit switch retainer element (24). Next,

the housing (27) is installed on the upper opening of the outer perimeter section (26) of the housing acceptor cylinder (5), which is installed on the support board (4). A head section retaining cylinder (28) is installed at the top section of this opening, and an air inlet window (29) is provided in this upper opening and a connector board (31) made of insulating material and provided with dust-proof mesh/screen (30) that is connected by means of bolts (32) to the retainer plate (25), air inlet windows (29), and air inlet windows (23), and is configured so that air passes between the inner and outer electrodes, the exhaust windows (6), and the exhaust windows (3), and is circulated to the outside when the fan motor (8) is operating.

At this time, when the high voltage transformer (11) and power source are connected by a switch, which is separately arranged (in practical terms, an input voltage of 100 V AC and output voltage of 7 KV DC are preferable) the airborne dust that is introduced [into the unit] is positively charged in the vicinity of the transformer (11), by the inner cylindrical electrode (14) that has been connected to the positive side by means of the electrostatic induction between the inner and outer electrodes, and is migrated to the external cylindrical electrodes (22) and clung to its walls.

Here, the direction of the air flow that is passing through the convex curved surfaces (12) and vertical curved surfaces (13) provided on the inner cylindrical electrode (14) is switched by the vertical curved surfaces (20) and recessed curved surfaces (21) provided on the outer cylindrical electrodes (22), and as a result of the change in the cross section layer between these electrodes, the spacing between the vertical curved surfaces (12), (20) of both electrodes should be approximately 20 mm; the spacing between the vertical curved surfaces (21) on the outer cylindrical electrodes (22) and the convex surfaces (13) on the inner cylindrical electrodes (14) should be approximately 16 mm; and the spacing between the recessed curved surfaces (21) on the outer cylindrical electrodes (22) and the vertical curved surfaces (12) on the inner cylindrical electrode (14) should be approximately 25 mm, for practical purposes. The recessed curved surfaces (21) should be 5 mm in diameter, while the convex curved surfaces (13) should be 4 mm in diameter. There is a change in flow rate, and the separation phenomenon is augmented. As a result, the dust-bearing air flow stagnates, reverses or becomes turbulent, thereby extending the duration for electrostatic adsorption and increasing dust collection efficiency (Fig. 6).

In the cross sectional configuration of the above mentioned both electrodes described above, in another embodiment, the convex curved surfaces (13) of the inner cylindrical electrodes (14) could have a gentle linear flow [illegible] convex curved surfaces (13) on the upstream side to intensify the switching of the direction of flow and the change in the flow passageway cross section, making it that much easier for the separation phenomenon to occur, forming lead (33) between the convex curved surfaces (13), (13) for a configuration that augments electrostatic induction. (Fig. 7)

Moreover, as a separate embodiment, convex curved surfaces (34) with gentle flow lines are formed on the upstream side of the outer cylindrical electrodes (22), and both flow line convex curved surfaces (34) and flow line convex curved surfaces (35) are positioned so they oppose one another, thereby intensifying the switching of the direction of flow and the change in the flow passageway cross section, extending the duration in which adsorption occurs due to stagnation, reverse flow, and turbulent flow of the dust-containing air (Fig. 8).

With regard to removal of dust clung onto the surfaces of the outer cylindrical electrodes, the power to electrode (22) is removed along with the retainer plate (25) by removing the connector board (31) and by pulling up and removing the head section retaining cylinder (28) and the housing (27), and after cleaning these, it is easy to restore them to their original state and join together. At this time, the retainer element (24) of the retainer plate (25) is separated from the limit switch

(17), thereby breaking off the flow of current between the high-voltage transformer (11) and the power source, so that there is no risk of electrocution.

As configured above, the present invention extends the duration of the cling effect on the outer cylindrical electrode by means of electrostatic induction of the dust-carrying air that passes between the electrodes, thereby increasing the efficiency of dust removal and reducing mold spores and yeast fungus.

Moreover, this is a particularly safe device since there is no danger that frictional force and resulting rectified electricity will be generated as a result of centrifugal force as the air passes through the unit, and the risk of malfunction due to sparking electric discharge between the adsorbed dust particles resulting in electrocution or explosion can be prevented, and the generation of ozone can be suppressed.

Also, given the device's simple and compact configuration, it can be manufactured less expensively, and it is also easy to move.

4. Brief Description of the Drawings

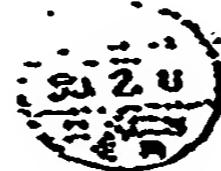
Figure 1 is a front view. Figure 2 is a plan view. Figure 3 is a view of the bottom surface. Figure 4 is a cross-sectional view along the A-A line in Figure 1. Figure 5 is a cross-sectional view along the B-B line in Figure 1. Figure 6 is an enlarged view of the area indicated by the letter E in Figure 4. Figure 7 is an enlarged flow line cross section diagram of another embodiment. Figure 8 is an enlarged flow line cross section diagram of yet another embodiment.

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Agent: Hiraki MIURA [seal]

特許願

特許厅長官
特許審査課
1. 発明の名称 金属接着剤
2. 類別番号 204002
3. 特許申請人 住 所 朝鮮内政部平壤市
氏 名 有成会社 代表取締役
4. 代理人 住 所 朝鮮内政部平壤市
氏 名 200-0701-3
5. 送付書類の目録
(1) 1 通
(2) 1 通
(3) 1 通
6. 天文局
7. 50 810060

④ 日本国特許庁
公開特許公報

①特開昭 51-90077
②公開日 昭51(1976)8.6
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④出願日 昭50(1975)2.6
審査請求 有 (全5頁)
厅内整理番号 4044-1

⑤日本分類
72 C14
⑥IPC
B03C 1/40

本発明はそれを大口径火薬用エジプト油燃焼剤に適用して
開発された軍事用化弾、いすゞ機械物とくにそれが子
供の安全衛生の開発の機械物の燃焼性をナシナシ化
し、本燃焼して所産物とより社会の環境問題とし
て大きく取り上げられており、大口径火薬燃焼剤に
ついて種々の研究論文が有り、有機物質の発生の
子供とより安全衛生が強化されば本火薬セーフ
火薬とはいえず、大口径火薬に本火薬の子供の火
薬は又は大人とより安全衛生の実験である。本
火薬は、上記火薬の子供とより安全衛生の実験
に適用しては開発に監視し、子供、動物試験
をして成るは又研究上等級、大品、小品等の生
物にかいても成る。本火薬はの開発技術にか
いて普及し、生産上不可欠の部品とせつた。

そこで、本火薬の安全衛生を公しておなじ
たがりの火薬が現れ実現され、そのいづれは本火薬
の開発技術にかいて開発され、本火薬を用い本火薬
に開発するものとよび本火薬開発により本火薬
をしきるものの又は本火薬を用い本火薬開発する
を本火薬に開発するものと本火薬開発の火

1. 発明の名称 空気吹出機器装置
2. 特許請求の範囲
本の発明を成すから大口径の火薬とんを、火
薬子を火薬筒を通過せしむるようした火薬筒装置
とし、上記筒内する火薬筒を通過する空気
を内れ火薬筒を吸出させ、本火薬筒の火薬筒を延長
させることによつて、火薬筒を用いてせんじる工
程を省略せしむるよりにしたことを特徴とする空
気吹出機器装置。
3. 発明の詳細な説明
本発明の発明は、空気吹出機器装置に付し、火薬
筒の火薬筒を火薬筒により吸出せしむる装置
とし、その火薬筒を延長するととのできる
装置に付し、その火薬筒で一端を火薬筒の端に
からなり。筒端を火薬筒とより成る火薬筒を筒端に
成る。かつ火薬筒に延長、より長い火薬筒を
得るとしてできる火薬筒装置を特徴とする
ものである。
本火薬筒の火薬筒に付し、各火薬筒装置に付し

合せ御合せたよつて百害無刃を限表せんとする。表記がなされてゐる。

此處、本院は本院内に於て審査の運びは、皆
大抵、初、空港入口から入られる空港事務室
を経つて、検査場に運び去られる本院の門
前を、内閣の内閣を駆けしながら通過すると、
次に大通心力を作用する検査、即、上院の検査
されて、内閣の内閣によって検査の上に於て
した検査結果を示す、空港事務室から本院の
門を通過する時本院は運営を受ける事とし
て大通心力を作用する検査が実行されてゐる。

上記の欠点は、音響気の吸引力と発電力とのせめぎあたる所を出つたものであるが、現在の外音防音に又々又々の欠点を呈示し、又入音側を防音せせる結果、上記の原因によつては外音防音にてつて變成音を生じ、外音に反対されたまんじんとの間に大音を生じ、しばしば困らせる事がある。又オソンの吸音を増大しオソン具を外音側上部にくくし、又しばしば外音を生ずる事の大音を防ぐ事によつたので可音化が困難でもつた。

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卷四 851-98027 (2)

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するより大変好んでゆして、内田洋蔵（124）と同様に
せて筆をした上、その上が細口紙に筆を寫（128）て
見え、下側にリミットスイッチの押え紙（129）を
付する西城本店からなる所（125）を筆致し、
本紙所配支本成（125）が多（126）したヘッドシグ（127）の頭頂の
上が細口紙が細口紙（125）にヘッドシグ（127）を取
し、その上万字の口紙に用紙神文（128）を筆致し
上、その上万字の口紙に用紙神文（128）を取（129）て上に細
口紙（125）を取（129）し大約本店からなる連絡（126）
を筆致し、ペースト（129）を大して押え紙（129）と連
絡し、細口紙を（125）し、ファンシート（129）を取
る所、文末は本店（125）かとひがえ紙（129）の記
入紙（129）かとひがえ紙（129）より、内、外側を裏面を過
ぎし、持（129）所、内側を細（125）に取（129）する所
致とする。

さらにも、既の実験所として、外気温度(20)C
- 上部熱に上いて吸水を促進する熱源(40)Cを設け
- 下部熱に下部熱に上いて吸水を促進する熱源(40)Cを設け、両実験室の実験は4月(10)を交互に
実験をめとして行なさせ、実験の方の結果、最初熱
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風、熱源熱に上る吸水作用時間より短めなことを
とめてある。(筆者註)

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して上へ強制(4)と強制(4)を強制(4)を強制(4)を強制(4)。
これを強制(4)で強制(4)しての強制(4)を強制(4)。

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・側面、胸外側部胸板において右の胸板
の胸板側面に於ける右の胸板側面
に於ける左の胸板側面(山本辰夫さん)が胸板
(21)に吸引され左の胸板に吸引される。

又、通過中の空氣比、或る方法によって既知実験による燃焼度の発生のさせはなく、よつて燃焼された上んじんとの間に火炎度を認めする事無からて燃焼度の測定を示すに終止することである。又オゾンの発生を抑制することともする爲めに袋れ大構造である。

さらに成績が満足不能であるので貢献を工具と
より大きい生産性を以て開拓されかつ本筋努力である。

卷之二

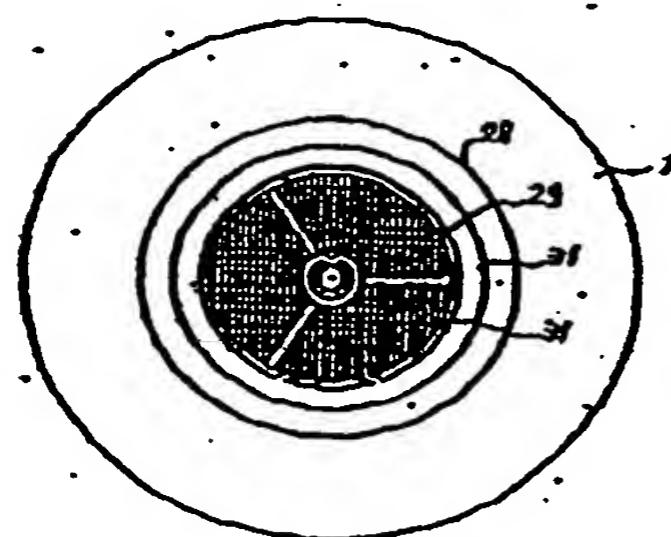
第二回枚正圖、第三回枚平圖、第四回一枚

適用、或いは比較的は一回の大手仕事の成績測定
、又は測定内容が一回の大手仕事の成績測定、等の都
度は、測定する成績測定装置、又は測定装置、
測定装置に付ける内蔵大頭部成績測定装置、等の測定装置
大頭部に付ける内蔵大頭部成績測定装置、等の測定装置
大頭部に付ける内蔵大頭部成績測定装置である。

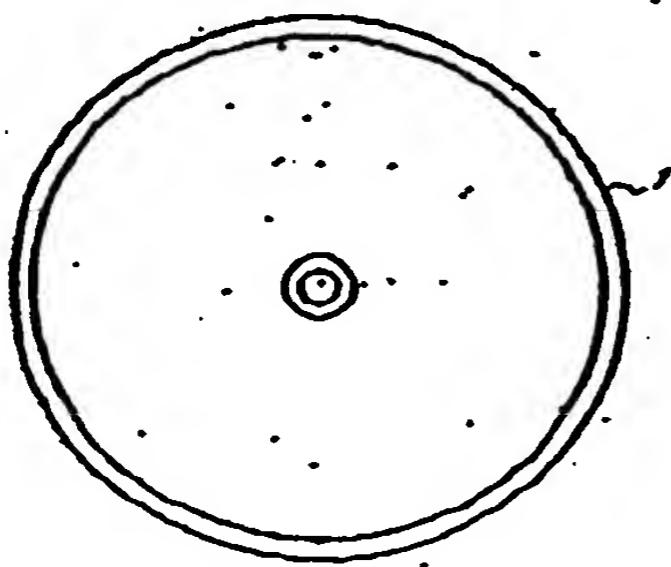
出願人 有識会社 第4回物工
代理人 三浦 勝

22

第2図



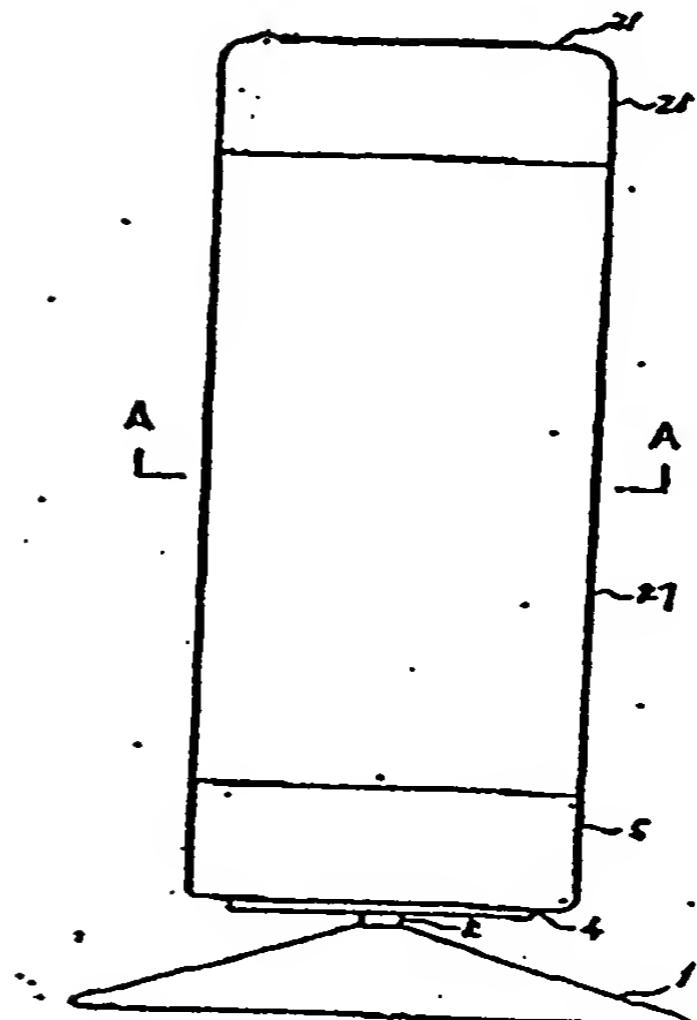
第3図



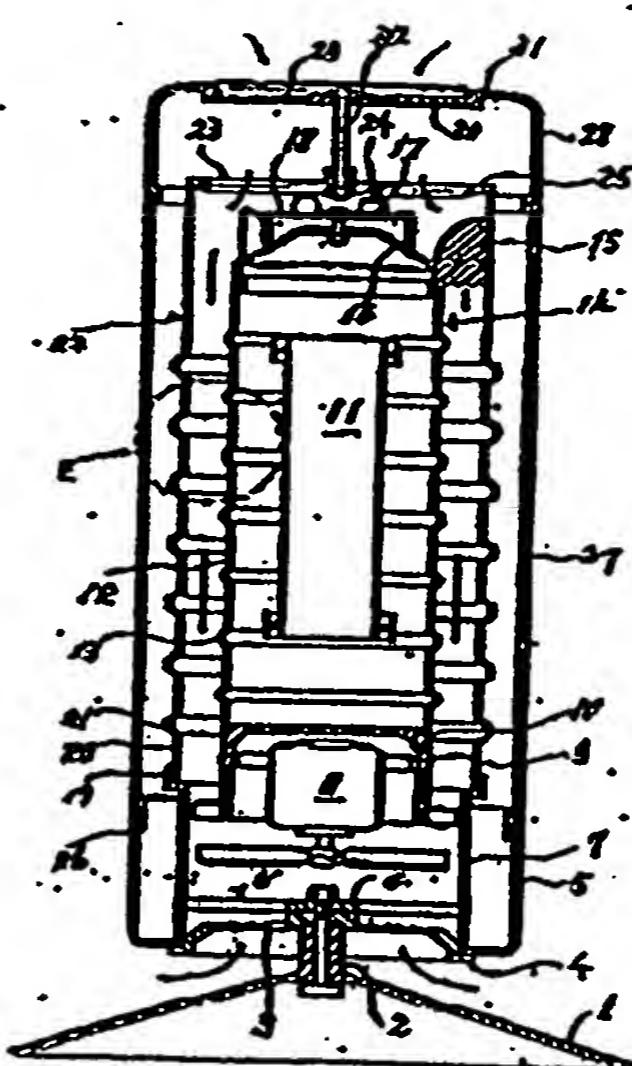
-400-

第1図

特明昭51-90077 (4)



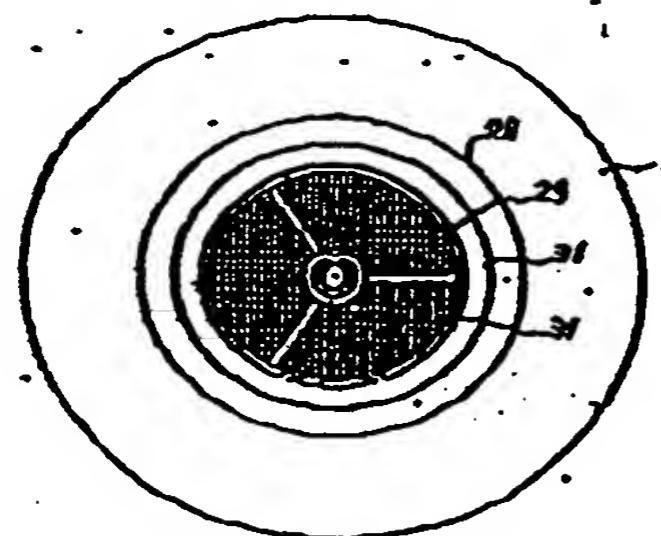
第4図



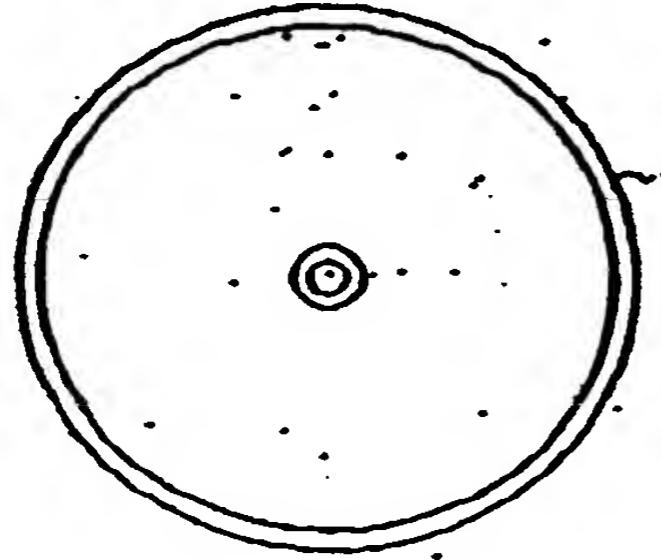
適用、所外に露出する部分へ直接火災を及ぼす可能性がある、又は可燃性の一方で火災を及ぼす可能性がある、又は可燃性の一方で火災を及ぼす可能性がある、又は可燃性の一方で火災を及ぼす可能性がある、又は可燃性の一方で火災を及ぼす可能性がある、又は可燃性の一方で火災を及ぼす可能性がある。

出願人 有機合成株式会社
代理人 三浦 稔

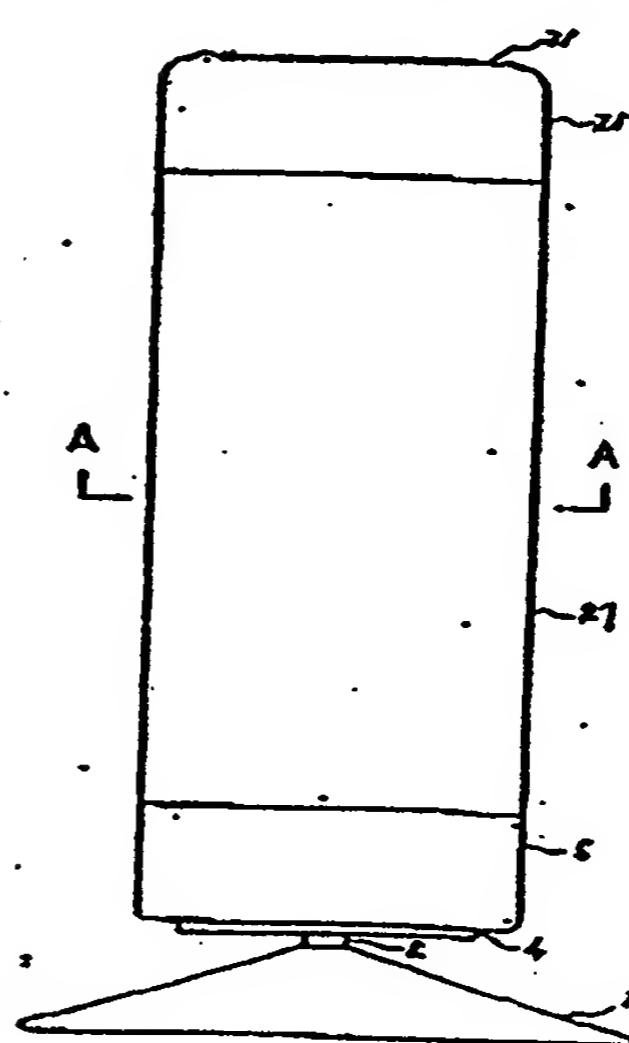
第2図



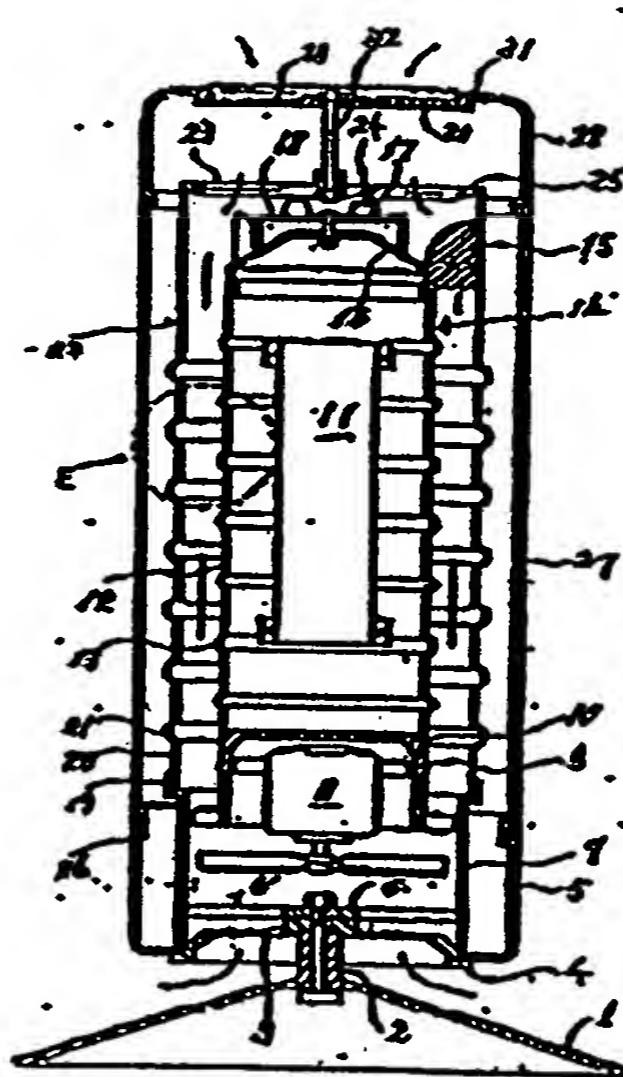
第3図



第1図

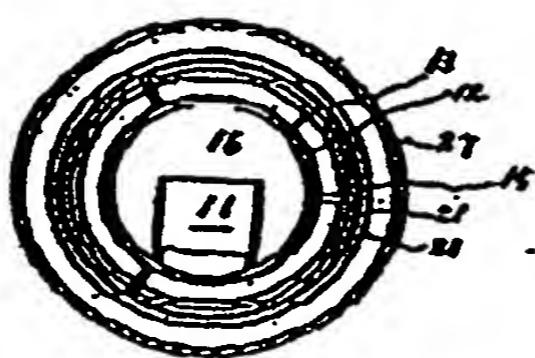


第4図

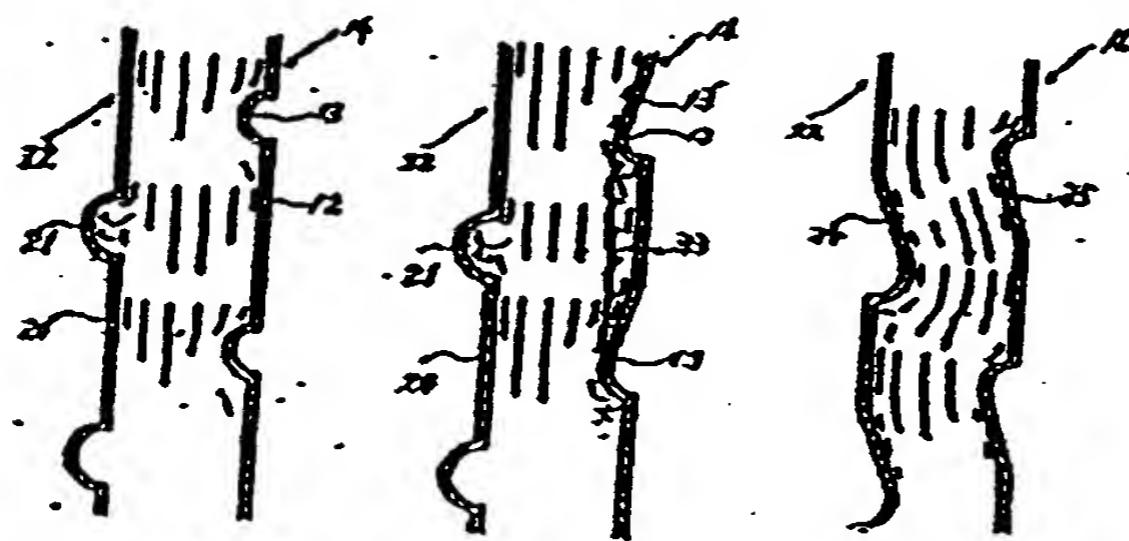


特開昭51-90077 5

第5図



第6図 第7図 第8図



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